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CENTRAL FAX CENTER

IN THE CLAIMS:

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- 1 1. (Currently amended) A method for megasonic cleaning , comprising :
- 2 a) providing a container having sidewalls on all sides of said container,
3 wherein at least two of said sidewalls have an overflow, said container
4 having a container inlet for flowing fluid into said container, said container
5 inlet located below said overflows;
- 6 b) providing ~~at least one from the group consisting of~~ a first megasonic
7 ~~transducer device~~ device with a first active surface ~~and a first array of megasonic~~
8 ~~transducers with a first array active surface~~ for providing vibrational energy
9 in said container;
- 10 c) providing a substrate having a side that includes a conductive film and
11 disposing said substrate in said container within said sidewalls and below
12 said overflow, wherein said side is facing, substantially parallel to, and
13 spaced a first spacing from ~~at least one from the group consisting of~~ said
14 first active surface ~~and said first array active surface~~;
- 15 d) immersing said substrate in said fluid, flowing said fluid upwardly in said
16 container from said container inlet, through said first spacing, and over said
17 overflows; and
- 18 e) applying energy to ~~at least one from the group including~~ said first
19 megasonic ~~device transducer and said first array of megasonic transducers~~ device to
20 provide vibration in said fluid and to clean the said substrate wherein
21 substantially all megasonic vibration provided in said fluid is from ~~at least~~
22 ~~one from the group consisting of said first megasonic transducer, said first~~

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23 ~~array of megasonic transducers, a transducer arranged a megasonic device~~
24 ~~having an active surface that is substantially parallel to said side first active~~
25 ~~surface, and a transducer arranged parallel to said first array active surface.~~

1 2. (previously presented) A method as recited in claim 1, further comprising providing
2 relative motion between said substrate and said ~~transducer~~ first megasonic device
3 while performing said fluid-flowing and energy-applying.

1 3. (previously presented) A method as recited in claim 1, wherein said substrate has a
2 substrate surface area and at least one from the group consisting of said first active
3 surface and said first array active surface has an area at least equal to 40% of the said
4 substrate surface area.

1 4. (previously presented) A method as recited in claim 1, wherein the said substrate has
2 a maximum diameter and said first spacing is in a range from 1% to 80% of said
3 maximum diameter.

1 5. (previously presented) A method as recited in claim 1, wherein said first spacing is in
2 a range from 1 micrometer to 160 millimeters.

1 6. (Currently amended) A method as recited in claim 1, wherein megasonic energy
2 applied to ~~at least one from the group consisting of said first megasonic device~~
3 ~~transducer and said first array of megasonic transducers~~ has a frequency of at least
4 400 kilohertz.

1 7. (Currently amended) A method as recited in claim 1, wherein megasonic energy
2 applied to ~~at least one from the group consisting of said first megasonic device~~
3 ~~transducer and said first array of megasonic transducers~~ has a maximum power of at
4 least 400 watts.

- 1 8. (Currently amended) A method as recited in claim 7, wherein megasonic energy is
2 applied to ~~at least one from the group consisting of said first megasonic device~~
3 ~~transducer and said first array of megasonic transducers~~ with 20% to 100% of said
4 maximum power.
- 1 9. (Currently amended) A method as recited in claim 1, wherein said first megasonic
2 ~~transducer device~~ has an area and a total input power and wherein said input power
3 divided by said area is at least four watts per square centimeter.
- 1 10. (previously presented) A method as recited in claim 1, wherein said flowing said
2 fluid upwardly in said container comprises flowing said fluid through said first
3 spacing at a fluid flow rate sufficient to carry particles away from the said substrate
4 before they redeposit on the substrate.
- 1 11. (previously presented) A method as recited in claim 1, wherein said container has a
2 volume and wherein said flowing said fluid comprises flowing said fluid through
3 said first spacing at a rate to replace said fluid in said volume in less than or equal to
4 one minute.
- 1 12. (Currently amended) A method as recited in claim 1, further comprising providing at
2 ~~least one from the group consisting of a second megasonic transducer device with a~~
3 ~~second active surface and a second array of megasonic transducers with a second~~
4 ~~array active surface~~ in said tank, wherein ~~at least one from the group consisting of~~
5 ~~said second active surface and said second array active surface~~ faces ~~at least one from~~
6 ~~the group consisting of said first active surface and said first array active surface~~, and
7 is substantially parallel to and spaced a second spacing from ~~at least one from the~~
8 ~~group consisting of said first active surface and said first array active surface~~.

1 13. (Currently amended) A method as recited in claim 12, further comprising completely
2 immersing in said fluid ~~at least one from the group consisting of said first megasonic~~
3 ~~device transducer and said first array of megasonic transducers and at least one from~~
4 ~~the group consisting of said second megasonic device transducer and said second~~
5 ~~array of megasonic transducers.~~

1 14. (Currently amended) A method as recited in claim 12, further comprising disposing
2 ~~the said~~ substrate in said container between ~~at least one from the group consisting of~~
3 ~~said first active surface and said first array active surface and at least one from the~~
4 ~~group consisting of said second active surface and said second array active surface.~~

1 15. (previously presented) A method as recited in claim 14, further comprising flowing
2 said fluid through said second spacing.

1 16. (Currently amended) A method as recited in claim 15, further comprising applying
2 energy to said second megasonic device transducer.

1 17. (Currently amended) A method as recited in claim 12, wherein said first megasonic
2 transducer device and said second megasonic transducer device provide energy to
3 clean both sides and edges of the said substrate.

1 18. (previously presented) A method as recited in claim 1, wherein said fluid comprises
2 one at least one from the group consisting of deionized water, dilute RCA cleaning
3 solution and dilute citric acid solution.

1 19. (Canceled)

1 20. (Canceled)

1 21. (Canceled)

2 22. (Currently amended) A method as recited in claim 1, further comprising completely
3 immersing said first megasonic device ~~transducer~~ in said fluid.

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1 23. (currently amended) A method for megasonic cleaning a single substrate,
2 comprising:

3 a) ~~providing a container comprising at least one from the group consisting of a first~~
4 ~~megasonic device transducer with a first active surface arranged in a horizontal~~
5 ~~plane and a first array of megasonic transducers with a first array active surface~~
6 ~~arranged in a horizontal plane, wherein at least one from the group consisting of~~
7 ~~said first megasonic device transducer and said first array of megasonic~~
8 ~~transducers is held in a fixed position, and wherein said container has sidewalls~~
9 ~~on all sides, wherein at least two of said sidewalls have an overflow, wherein~~
10 ~~said container has a container inlet for flowing fluid into said container, wherein~~
11 ~~said container inlet is located below said overflows;~~

12 b) providing a single substrate having a side that includes a conductive film and
13 disposing said single substrate in said container within said sidewalls, below
14 said overflow, wherein said side is facing, substantially parallel to, and spaced a
15 spacing from ~~at least one from the group consisting of said first active surface~~
16 ~~and said first array active surface;~~

17 c) immersing said single substrate in a fluid and flowing said fluid upwardly in said
18 container from said container inlet, through said spacing, and over said
19 overflows; and

20 d) applying energy to said first megasonic ~~transducer~~ device wherein substantially
21 all megasonic vibration provided in said fluid is from is from ~~at least one from~~
22 ~~the group consisting of said first megasonic transducer, said first array of~~
23 ~~megasonic transducers, a transducer arranged a megasonic device having an~~
24 ~~active surface that is substantially~~ parallel to said ~~side~~ first active surface, and a
25 ~~transducer arranged parallel to said first array active surface.~~

24-58. (Canceled)

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1 59. (Currently Amended) A method for megasonic cleaning a single substrate,
2 comprising :

3 (a) providing a container having sidewalls on all sides of said
4 container, wherein at least two of said sidewalls have an overflow ,
5 said container having a container inlet for flowing fluid into said
6 container, said container inlet located below said overflows;

7 (b) providing a first megasonic device transducer with at least one
8 ~~from the group consisting of a first active surface and a first array~~
9 ~~of megasonic transducers with a first array active surface~~, wherein
10 ~~at least one from the group consisting of~~ said first active surface
11 ~~and said first array active surface~~ is arranged in a horizontal plane
12 to provide megasonic vibration in said container;

13 (c) providing a single substrate having a side that includes a
14 conductive film and disposing said single substrate in said
15 container within said sidewalls, below said overflow, wherein said
16 side is facing, substantially parallel to, and spaced a first spacing
17 ~~from at least one from the group consisting of~~ said first active
18 ~~surface and said first array active surface~~, wherein said single
19 substrate is within said sidewalls and below said overflows;

20 (d) providing a fluid in said container, immersing said single substrate
21 in said fluid, and flowing said fluid upwardly in said container
22 from said container inlet, through said first spacing, and over said
23 overflows; and

24 (e) applying energy to said first megasonic transducer, wherein

25 substantially all megasonic vibration provided in said fluid is from
26 at least one from the group consisting of said first megasonic
27 transducer, said first array of megasonic transducers, a transducer
28 arranged a megasonic device having an active surface that is
29 substantially parallel to said side first active surface, and a
30 transducer arranged parallel to said first array active surface.

1 60. (previously presented) A method as recited in claim 59, wherein said single substrate
2 has a substrate surface area and said first active surface or said first array active
3 surface has an area at least equal to 40% of said substrate surface area.

1 61. (Currently amended) A method as recited in claim 59, wherein said single substrate
2 has a substrate surface and wherein said first megasonic device transducer or said
3 first array of megasonic transducers is larger than said substrate surface.

1 62. (Currently amended) A method as recited in claim 59, wherein the said single
2 substrate has a maximum diameter and said first spacing is in a range from 1% to
3 80% of said maximum diameter.

1 63. (previously presented) A method as recited in claim 59, wherein said first spacing is
2 in a range from 1 micrometer to 160 millimeters.

1 64. (Currently amended) A method as recited in claim 59, wherein megasonic energy
2 applied to said first megasonic device transducer or said first array of megasonic
3 transducers has a frequency of at least 400 kilohertz.

1 65. (Currently amended) A method as recited in claim 59, wherein megasonic energy
2 applied to said first megasonic device transducer or said first array of megasonic
3 transducers has a maximum power of at least 400 watts.

1 66. (Currently amended) A method as recited in claim 65, wherein said megasonic
2 energy is applied to ~~at least one from the group consisting of said first megasonic~~
3 ~~device transducer and said first array of megasonic transducers~~ with 20% to 100% of
4 said maximum power.

1 67. (previously presented) A method as recited in claim 59, wherein said first megasonic
2 ~~device transducer has an area and a total input power and wherein said input power~~
3 divided by said transducer area is at least four watts per square centimeter.

1 68. (previously presented) A method as recited in claim 59, wherein said flowing said
2 fluid comprises flowing said fluid through said first spacing at a fluid flow rate
3 sufficient to carry particles away from the said single substrate before they redeposit
4 on the said single substrate.

1 69. (previously presented) A method as recited in claim 59, wherein said container has a
2 volume and wherein said flowing a fluid comprises flowing a fluid through said
3 space between the said single substrate and said transducer at a rate to replace the
4 said fluid in said volume in less than or equal to one minute.

1 70. (Currently amended) A method as recited in claim 59, further comprising providing
2 ~~at least one from the group consisting of a second megasonic device transducer with~~
3 ~~a second active surface and a second array of megasonic transducers with a second~~
4 ~~array active surface~~ in said tank, wherein ~~at least one from the group consisting of~~
5 ~~said second active surface and said second array active surface~~ faces at least one from
6 ~~the group consisting of said first active surface and said first array active surface~~, and
7 is substantially parallel to and spaced a second spacing from ~~at least one from the~~
8 ~~group consisting of said first active surface and said first array active surface~~.

- 1 71. (Currently amended) A method as recited in claim 70, wherein further comprising
2 completely immersing in said fluid ~~at least one from the group consisting of~~ said first
3 megasonic device transducer and ~~said first array of megasonic transducers and at~~
4 ~~least one from the group consisting of~~ said second megasonic device transducer
5 and ~~said second array of megasonic transducers~~.

- 1 72. (Currently amended) A method as recited in claim 70, further comprising disposing
2 the said single substrate in said container between ~~at least one from the group~~
3 ~~consisting of~~ said first active surface and ~~said first array active surface and at least~~
4 ~~one from the group consisting of~~ said second active surface and ~~said second array~~
5 ~~active surface~~.

- 1 73. (previously presented) A method as recited in claim 72, further comprising flowing
2 said fluid through said second spacing.

- 1 74. (Currently amended) A method as recited in claim 73, further comprising applying
2 energy to said second megasonic device transducer.

- 1 75. (Currently amended) A method as recited in claim 70, wherein said first megasonic
2 device transducer and said second megasonic device transducer provide energy to
3 clean both sides and edges of the said single substrate.

- 1 76. (previously presented) A method as recited in claim 59, wherein said fluid comprises
2 ~~one at least one from the group consisting of~~ deionized water, dilute RCA cleaning
3 solution and dilute citric acid solution.

- 1 77. (Currently amended) A method as recited in claim 1, wherein at least one from the
2 group consisting of said first megasonic device transducer ~~and said first array of~~
3 ~~megasonic transducers~~ is larger than said substrate.

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- 1 78. (Currently amended) A method as recited in claim 23, wherein said first megasonic
2 device transducer is larger than said single substrate.
- 1 79. Cancel
- 1 80. (Currently amended) The A method as recited in claim 1, wherein ~~at least one from~~
2 ~~the group consisting of said first active surface and said first array active surface~~ is
3 arranged in a horizontal plane.
- 1 81. (Currently amended) The A method as recited in claim 1, wherein ~~at least one from~~
2 ~~the group consisting of said first active surface and said first array active surface~~ is
3 arranged in a vertical plane.
- 1 82.-98 cancel
- 1 99. (Currently amended) A method as recited in claim 2, wherein said providing relative
2 motion between said substrate and said ~~transducer~~ first megasonic device is in a
3 direction substantially parallel to the said substrate.
- 1 100. (previously presented) A method as recited in claim 1, wherein said conductive
2 film includes a metallic film.
- 1 101. (previously presented) A method as recited in claim 23, wherein said conductive
2 film includes a metallic film.
- 1 102. (previously presented) A method as recited in claim 59, wherein said conductive
2 film includes a metallic film.

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- 3 103. (New) A method as recited in claim 1, wherein said first megasonic device
4 includes a megasonic transducer.
- 1 104. (New) A method as recited in claim 1, wherein said first megasonic device
2 includes an array of megasonic transducers.
- 1 105. (New) A method as recited in claim 23, wherein said first megasonic device
2 includes a megasonic transducer.
- 1 106. (New) A method as recited in claim 23, wherein said first megasonic device
2 includes an array of megasonic transducers.
- 1 107. (New) A method as recited in claim 59, wherein said first megasonic device
2 includes a megasonic transducer.
- 1 108. (New) A method as recited in claim 59, wherein said first megasonic device
2 includes an array of megasonic transducers.
- 1 109. (New) A method as recited in claim 1, wherein said fluid comprises one from
2 the group consisting of a basic chemistry and an acidic chemistry.
- 1 110. (New) A method as recited in claim 23, wherein said fluid comprises at least one
2 from the group consisting deionized water, dilute RCA cleaning solution and
3 dilute citric acid solution.
- 1 111. (New) A method as recited in claim 23, wherein said fluid comprises one from
2 the group consisting of a basic chemistry and an acidic chemistry.

- 1 112. (New) A method as recited in claim 59, wherein said fluid comprises one from
2 the group consisting of a basic chemistry and an acidic chemistry.

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